The Commission's concern regarding imperfect compatibility, or absolute non-compatibility, focuses on a very key issue as the satellite and cable industries move ahead in adopting new technologies. The Commission in this NOI and in future proceedings must consider this issue and consider means that not only mitigate against consumer inconvenience, but, particularly in light of the issues addressed by this NOI, also guard against the establishment of a new monopolistic environment that would affect the industry's ability to effectively service consumers.

It is our belief that if the industry moves to exclusionary systems, then by definition, "non-compatible" negates coexistence and therefore competition among encryption and conditional access suppliers. We believe that competition would result in widespread consumer benefits. However, it is important to note that it is possible and, we believe, desirable to have competing encryption and conditional access systems that coexist in the same signal, even though they are "imperfectly compatible," i.e., different cryptographically, and hence invisible to each other as long as compatibility exists at some level. For example, the VCRS and LSCS systems operate with, and require, the same program key (although this key is encrypted differently for the transmission of program "rekey" messages - so that one system is invisible to the other) and the identical working key (the lowest level in the key system hierarchy). Encryption system compatibility at the appropriate level, we believe, will serve the consumer now and in the future as technology moves forward into digital compression and high-powered DBS systems.

We note that there has been much industry discussion about broadly licensing compression technology such that a variety of manufacturers might supply the decompression equipment. It is our concern, however, as these discussions evolve that the Commission and the industry recognize that without a standardized "bridge" between "the" compression system and the conditional access, encryption, and subscriber management system, there will result yet a new monopoly situation similar to the one that exists today with the General Instrument owned and operated DBS Center. This new monopoly will dictate where consumers will be required to go to gain authorization for subscription or IPPV television services. As currently discussed in the cable/satellite industries, a single entity will provide what in essence will be the "dial tone." We would encourage the industries and the Commission to consider the implication of such a monopoly situation and consider the alternative whereby an agreed upon "bridge" were accepted by all industry segments. Such a bridge will allow a variety of encryption and conditional access companies to authorize and deauthorize consumers from several authorization centers while all "modules" would be compatible with the receivers being manufactured. The resulting competition would accrue immediately to the benefit of consumers as retailers, program providers, and back office business systems that sell the programming vie for consumers' business.

As to imperfect compatibility regarding programming access and receiver features, this condition has existed in the marketplace for some time, and, has in fact accrued to the consumer's benefit as well as to the benefit of the programming and distribution segments of the industry.

Multiple examples of this are available, but we confine ourselves to the development that began earlier this year with the start of service via the new higher-powered Galaxy 5 satellite (G-5). More than 20 of the most popular programming services were congregated on this single, higher-powered C-band satellite located in an arc position that provides high quality reception throughout the continental United States.

Based around G-5, manufacturers, distributors, retailers and programmers developed, individually and cooperatively, a wide range of programs to attract new consumers. Each of these programs is based on "imperfect compatibility" with other HSD equipment and HSD programming access.

With G-5, equipment manufacturers recognized an opportunity to break through two well-known barriers to attracting new consumers to the HSD market, namely the size of the receive dish and the overall price of an HSD system. They developed HSD receivers that were not supported by antenna positioning capability to reduce cost, and developed 4-5 foot receive dishes, or about three-fourths smaller in area than the typical 10-foot receive dish. These fixed-look dishes are positioned to look only at the G-5 and receive only the programming services on G-5. With reduced manufacturing costs for the receiver, outside electronics and dish, manufacturers were able to offer a breakthrough in consumer price, with the overall system costing about $1200-1500 at retail, compared to an average selling price for a receiver, outside electronics and 10-foot dish of approximately $2,500.

Many manufacturers and distributors expanded upon the G-5 opportunity, working closely with the G-5 program services to package subscriptions as part of the purchase of G-5 systems. The result was that consumers could finance the purchase of a G-5 hardware system and one year's subscription to most of the G-5 channels for a breakthrough price point of $29 per month.

The G-5 programs are among the most successful the industry has experienced since the start of scrambling. Hardware sales increased as did subscription sales.

Yet the programs were and are "imperfectly compatible" with other HSD programs. There is not perfect compatibility, or full access to all satellites, and there is not perfect compatibility, or full access to all available satellite cable programming services. There has been no consumer confusion or market disruption by this strong introduction of "imperfect competition" in the HSD market.

We believe the Commission's question here is directed to the very distinct possibility that a LSCS and a VCRS module might provide access to a different menu of subscription programming, employ a different mechanism for instant pay-per-view access and the like. It is our belief, clearly

borne out by the G-5 example, that some applications of HSD imperfect compatibility are appropriate for the market and in fact may become very important in a competitive market.

I. Programmer benefits of intra-VCII competition.

The Commission seeks specific information on the impact of intra-VCII competition on the volume of HSD subscribers. To assist programmers in conducting such an analysis, Titan Satellite Systems Corporation has presented a very conservative parametric analysis of the potential impact on new system sales, subscription sales and "conversion sales" to consumers who have previously owned tampered VCII-equipped systems.

The following chart highlights the potential positive subscriber and resulting financial impacts that are possible for programmers when Titan Satellite Systems Corporation successfully enters the market.

Overall Market Value Change with Titan

Additional Conversion/ On-going Customers	Incremental Subscribers (Conversion)[1]	1993-95 Incremental Subscribers (On-going)[2]	Total Subscriber Increase	Total Incremental Revenue[3]	Value Increase ($000's)[4]
5%	60,000	33,750	93,750	$21,093,750	$46,975
10%	120,00	67,500	187,500	$42,187,500	$93,750
15%	180,00	101,250	281,250	$63,281,250	$140,625

1. Assumes 1.2 million conversion prospects.
2. Assumes 725,000 new systems sales, 1993-1995
3. Based on average cost of 20 basic and one premium channel
4. Assumes an HSD subscriber adds $500 value to programming community.

As this chart clearly indicates, the upside opportunity provided by the introduction of intra-VCII competition is potentially significant. This analysis is based only on the ability of Titan Satellite Systems Corporation to expand the market, something we believe is very realistic. We believe this because, (1), our lower cost modules will assist manufacturers in removing cost from their product providing for lower retail prices to attract new, first-time buyers, (2), our lower-cost module will result in lower retail prices for conversion prospects, or will provide the consumer

with the ability to purchase more entertainment programming by spending less on hardware, and, (3), the LSCS module will provide conversion prospects with the opportunity to buy a conversion module from a non -General Instrument supplier, therefore helping to retain those HSD consumers who may have otherwise abandoned their HSD system because of their dissatisfaction with the sole supplier situation.

m. Other considerations that are affecting programmers' decisions whether to authorize non-GIC descramblers.

For nearly a year, representatives of The Titan Corporation have met with satellite cable programmers to gauge their response to the possibility of intra-VCII competition. It was based on the overwhelmingly positive response that the corporation proceeded with the formation of the joint venture, Titan Satellite Systems Corporation.

Since its formation in July 1992, Titan Satellite Systems Corporation has met with virtually all satellite cable programmers to review its business plans, its LSCS technology, its Titan Authorization Center, its product development program and other business issues. These sessions have included meetings at our offices, at individual programmer locations, group meetings at industry trade shows and at our facilities in San Diego.

Programmers have generally been accessible, attentive and willing to frankly discuss the issues that are paramount to them in considering whether to contract with Titan Satellite Systems Corporation. It is our general view that the programming community now accepts the fact that the LSCS system is technically feasible, that its impact on their uplink and subscriber services operations is inconsequential, that the costs of working with a second encryption company are reasonable based on the potential for incremental subscriber and revenue growth, and that there is great benefit in intra-VCII competition in the area of security, consumer pricing and the like.

Despite what can only be characterized as positive programmer response, we have yet to conclude a single contract with a satellite cable programmer. Again, the programmers are candid about the reasons they are as yet unwilling to conclude a contract with us to allow our descramblers to be authorizable for their programming services, and those reasons are very important for the Commission to consider in this NOI. These reasons, as told to us by programmers, are:

- The threat of a lawsuit brought by General Instrument against a programmer -- or termination of technical support for that programmer -- for an alleged violation of certain software license and maintenance agreements should a programmer agree to append LSCS unit keys to their existing commercial unit key list.

- The costs associated with supporting the operation of a second authorization center.

- G.I.'s assertion to programmers that, for reasons of improved security, the VCII Commercial Authorization stream must be removed, and to accomplish this, all HBI message insertion capability must be removed.

- The credibility and viability of Titan Satellite System Corporation

- Overall LSCS system security; and,

- Titan Satellite System Corporation's future plans and capabilities to develop and implement signal compression technology into the LSCS system.

n. Positive response by Titan Satellite Systems Corporation to programmer concerns.

While Titan Satellite Systems Corporation believes that these concerns are very real, we also believe that they are addressable, and, we have responded positively to each of them. Beginning in September 1992, we sent to each programmer our response to each of these issues, along with a proposed "Letter of Intent" (Appendix D) that would enable programmers to express their commitment to work with us provided we met certain specific, stringent conditions, including positive response to those issues/concerns listed immediately above. The following explains our response to each of the stated areas of concern:

(i) Threats by General Instrument.

Titan Satellite Systems Corporation has agreed to provide indemnification for programmers related to any patent infringement litigation that may result from Titan Satellite Systems Corporation's market entry.

As to concerns about legal action regarding the programmers' software license and maintenance agreements with G.I., we have retained counsel to explore the issues that General Instrument is invoking in its claim with programmers that the utilization of a normal function of the channel control system software to add a random number (unit key) to an existing list of keys constitutes a breach of their software license agreements with General Instrument and subjects them to cancellation of these agreements, and hence the termination of technical support or possible litigation. Under the Commission's confidentiality rules we have filed with the Commission the legal opinion provided by our outside counsel regarding the value of General Instrument's

copyright claims now seemingly made to enforce their threat of lawsuits or service termination, and, for the public record provide the following summary:

Generally, based on the software license agreement and software maintenance agreement language that was a part of the early software maintenance and license agreements between G.I. and the users of the software, the agreements do not forbid the programmer to use Titan's codes in conjunction with the software, nor does such a use provide a valid basis to terminate the customer's maintenance agreement.

It is our belief that the action by General Instrument in threatening programmers with lawsuits and/or non-support based on software license and maintenance agreements is a canard. Moreover, this very threat is an abuse of a patent/copyright position and its unregulated monopoly status as the sole supplier of the encryption software and hardware.

(ii) Costs of supporting a second authorization center.

Titan Satellite Systems Corporation has offered programmers an attractive arrangement regarding the operation of the Titan Authorization Center (TAC).

First, we have offered two methods of deferring billing for the TAC for programmers. For those programmers, based on our September contract proposal, who concluded agreements with us by November 1, 1992, we agreed to eliminate all fees and costs for the first 12 months of operation of the TAC and defer billing for the second 12 months until the 25th month of operation. For those who signed agreements after November 1, 1992, we offered to defer all billing for TAC expenses for the first 12 months of operations.

Second, we have offered contract terms whereby we would defer all billing for necessary uplink hardware and software for 12 months. In addition, for those programmers reaching a contract with us by November 1, 1992, we offered to install all necessary uplink hardware and software free of charge, and to pay for the installation and first-year lease costs of the necessary telephone lines linking programmers' business systems with the TAC.

And third, we offered a ceiling on the development and operating costs for the TAC through 1999, and a recovery schedule for any deferred billing at a very low, per-subscriber rate, based on subscriber usage of the system and spread over the next three years of TAC operation.

Thus, in terms of the cost of operating a second authorization center, we have offered an economic package that would eliminate or defer costs until such time as programmers working with us had realized the incremental subscriber and income growth potential we see stemming from intra-VCII competition.

(iii) Signals sent in the horizontal blanking interval.

Titan Satellite Systems Corporation has reviewed with programmers the issues related to their legal, contractual and business rights to maintain the ability to use the authorization channel capability that resides in the HBI presently used for VCII commercial authorization messages.

We are told by programmers that General Instrument has already completed the installation of a mechanism at many programmer uplink sites that is designed to eliminate the ability to insert information into the HBI. The stated purpose is system security -- or elimination of the alleged weak point in the Videocipher security system, the HBI.

This is an erroneous claim from General Instrument. Even in its own public pronouncements, General Instrument has said that the breach of VCII has come because of the hardware implementation of the cryptographic functions.

The initial VCII system breach was the result of the pirate community's ability to learn the secret identities embedded within the VCII modules and then to "clone" these unit's identities. By authorizing a single, breached unit, all clones using that identity were authorized as well. Over time, the pirate attacks have become more sophisticated but still require specific pirated unit identities to be transmitted in the authorization channel to continue to receive programming without payment. With programmers' cooperation, General Instrument has removed all the piratable VCII consumer descrambler identification numbers and unit keys from the authorization channel. However, the pirates have also purchased and determined the secret identities of many VCII descramblers used by cable operators at their head-ends to descramble programming prior to sending it via coaxial cable to consumer homes. Although a much more complex task, these commercial unit identifications are now being used to illegally authorize consumer VCII units. To be able to remove these commercial descrambler identities from the authorization channel, the piratable commercial descramblers must first be replaced with secure descramblers. (Both the VCII consumer and commercial unit identities have existed in the HBI portion of a programmer's signal transmission.) Whether the unit identities are being transmitted in the HBI or the VBI is irrelevant from a security standpoint. The commercial units must be replaced with secure descramblers at the cable head-end and then the piratable unit identities removed from the authorization channel and the data base in the programmer's channel control system computer. However, it is unnecessary to remove the ability to insert new, secure unit identities into the HBI to ensure future security. To remove this ability is equivalent to saying that General Instrument intends to move its authorization messages back to the HBI from the VBI and remove VBI messaging capability if the VCRS is defeated. General Instrument, of course, does not intend to do that. They will merely distribute smart cards containing new, secure identities and then eliminate all piratable identities they have sold and authorized, and continue to transmit these new, secure, identities in the VBI.

We believe the Commission will conclude as we have that this General Instrument contention and its actions to eliminate HBI message insertion capability is a blatant attempt to block the market entry of Titan Satellite Systems Corporation.

We believe most of General Instrument's contracts and agreements related to the DBS Center and DBS Software License have been held confidential by General Instrument and programmers.

However, early in 1992, General Instrument did provide to Titan Satellite Systems Corporation, without requesting or requiring non-disclosure, a full copy of it "DBS Authorization Center Agreement for Program Distributor," a copy of which we submit with these comments (Appendix E). We believe it is noteworthy that in this agreement, General Instrument, acting either as "parent" or "Centercorp" extends to its "users" the right to request, and pay for enhancements to the DBS software package:

"... if a particular User or group of Users wishes additional features and services which require enhancement of the equipment or software of the Center, Parent and/or Centercorp shall be entitled to add such equipment and services to the Center at its sole cost and expense, or at the sole cost and expense of such particular User, or group of Users ..."

This clause of the agreement provides programmers, who have purchased and own the VCII scrambler, the ability to request modifications needed for their particular business needs. Such requests could presumably include maintenance of access to the horizontal blanking interval.

We have called this contract clause to the attention of many programmers. Despite this "independence" clause, programmers tell us that they fear that General Instrument will sue them for contract violation should they attempt to maintain the HBI for Titan Satellite Systems Corporation.

Again, this is an abuse of patent position and a de facto monopoly market presence that should be carefully reviewed and acted upon by the Commission in this inquiry.

(iv) The viability of Titan Satellite Systems Corporation.

General Instrument, in perhaps its only response to Titan Satellite Systems Corporation that might be characterized as "normal" competition, has spent considerable effort with programmers questioning the viability of our organization, financially and in terms of management and engineering capability.

We confess that neither the joint venture nor any of its individual partners are as large as General Instrument Corp. in terms of revenues or employees, (although in recent years the combined profits of the joint venture partners certainly have surpassed those of General Instrument). We are small, entrepreneurial in spirit and financially independent.

The credentials of our partners and our staff are extremely strong and credible:

The Titan Corporation is a NYSE-traded company that has been a leading supplier of electronics and contract engineering for many years, primarily serving the U.S. government and the defense industry. It has broad and highly sophisticated experience in the secure communications arena. This experience has included development programs for the White House communications system, the Pentagon Crisis Center and the federal Joint Task Force's drug interdiction command center.

Houston Satellite Systems, Inc., a private company, is one of the leading manufacturers of satellite receivers for the HSD market. The company is known for its innovative product designs and implementation of new technology in HSD systems. The company was the first to develop and introduce a microprocessor-controlled dish positioner, the first to introduce receivers integrating the VCII module, and the first to widely offer UHF remote controls for satellite receivers to the HSD market

Tom A. Ortolf is the former president of Houston Satellite Systems, Inc.

The credentials of our engineering staff are impressive. We submit in Appendix F an overview of some of the key engineering staff members.

The joint venture partners have invested heavily in the LSCS program and the formation of Titan Satellite Systems Corporation, in addition to the investment by The Titan Corporation in acquiring M/A-COM Government Systems Inc. As outlined earlier in this document, the organization has passed many significant milestones as a result of that on-going and significant investment. We have the financial strength to proceed to market and the determination to do so, even when faced with a well-entrenched, massive monopoly such as General Instrument.

As programmers learn of our organization, its personnel, its financing and its performance to date, we find that concerns about our credibility and viability are eliminated.

(v) Overall system security.

This is an important concern for programmers and the entire industry. Before forming Titan Satellite Systems Corporation, each of the joint venture partners completed "due diligence" reviews of the security features and implementation of the LSCS system. Individually and collectively, we have concluded that the LSCS system offers a state of the art, advanced security/conditional access system for addressing the HSD consumer.

We have not stopped, however, with our initial system review. The security of the LSCS system has been subjected to independent security reviews throughout its development. These ongoing studies are being conducted by leading, independent security consultants. They are: (1) Merdan Group, Inc., (2) Roy Griffin, and (3) RSA Data Security, Inc. Both the Merdan Group and RSA are nationally recognized security firms having special expertise in the area of security

system design. Mr. Griffin has special expertise by virtue of his significant anti-piracy experience while working for General Instrument. The feedback and recommendations from these companies has helped significantly in strengthening the overall security of the LSCS system.

We have reviewed these findings with programmers.

We believe the security information we have provided coupled with the in depth explanations and direction of our overall security plan and ongoing security reviews and analysis have gone far in allaying programmer concerns regarding system security.

(vi) A Clear Path To Compression.

Although this issue has been raised by only two programmers, both are critical to Titan Satellite System Corporation's market entry. Titan Satellite System Corporation's position regarding digital compression has been that once a "clear path" exists for compression, then Titan Satellite System Corporation will have one. We, of course, have had discussions with several compression development companies over the past several months, and will continue to explore potential opportunities. If compression technologies are to be broadly licensed, then Titan Satellite System Corporation should have the capability to become a licensee and apply the LSCS encryption/conditional access technology to that compression scheme, unless that portion of the system remains proprietary and no "bridge" exists for alternative encryption technologies. However, even with that situation, the present analog C/Ku band market will exist for at least the next 8-10 year time period. The cost and quality of the support needed to service and grow this market over the next 8-10 years will be best for the consumer in a competitive rather than a sole-source environment.

We are generally pleased that we have been able to provide positive responses with technical and economic solutions for programmers. Nevertheless, we do not yet have an executed programmer contract. We believe the issues of our credibility/viability, system security, compression and authorization center costs will soon no longer be barriers to reaching an agreement.

Upon the completion of our beta test and complete system integration early next month and the completion of the security system review, we believe there can be no plausible reason for a programmer to be unwilling to allow LSCS modules to be authorizable for their service. We must conclude, if such unwillingness continues past these next development stages, that the initial threats of legal action and/or removal of technical support made by General Instrument, or General Instrument's insistence on the removal of HBI message insertion capability, are continuing to have a major impact.

Such threats or arrangements are not only barriers to contract agreements, but are chilling to the market and abusive of monopoly power and patent positions. If the Commission seeks to foster competition as an effective, market-driven method to secure fair prices and adequate supply for consumers, the Commission must consider what remedies must be applied to end such abuses.

IV. The Benefits of Intra-VCII Competition.

The potential benefits of intra-VCII competition are numerous and will accrue to the benefit of consumers and to the businesses that now serve the HSD market. The potential financial savings to consumers alone are significant. The ability to attract new customers and expand the HSD market is important to dealers. The opportunity to invest such savings in financial rebuilding and in new research and development is vital to manufacturers. And the opportunity to enjoy significant incremental growth in consumer conversions and new subscribers is significant. Each of these major and positive events can and will occur if true intra-VCII competition occurs.

Clearly the most tangible and measurable benefit of intra-VCII competition is readily discerned in a comparison of pricing schedules. We highlight four categories where the contrast in pricing is dramatic:

	Titan Satellite	GI
Introductory price	$199	N/A
Module price, wholesale	$249	$336
Cageless descrambler	$209	N/A
Commercial descrambler	$344	$450

The Commission states *<at page 2, paragraph 2>*, "We continue to believe that competition in the home satellite dish marketplace is likely to benefit consumers by providing an increasing range of choices both in program sources and in user-friendly reception equipment with sophisticated features and by holding down the prices of these goods and services."

We believe the Commission is correct.

In the programming sector of the HSD marketplace, competition has resulted in price reductions and the development of reasonably priced packages of services. Programmers and third-party program distributors compete for customers on the basis of price, quality and service.

In the receiver segment of the market, original equipment manufacturers compete vigorously. The result has been lower retail prices (if one does not include the price of the descrambler module) and development of new features to enhance consumer enjoyment of home satellite television.

In the antenna and outside electronics market segment, there also exists significant competition among manufacturers and suppliers. And again, the result has been lower consumer prices and advancements in equipment features and reliability to the benefit of the consumer.

It is only in the descrambler segment where the HSD marketplace has seen non-stop price escalation. This has been detrimental to consumers as well as to all other market segments. And it is in this segment alone in the HSD industry in which there is no competition. If competition has been beneficial to the consumer in other HSD market segments, why not in the descrambler segment? Past inquiries into encryption could not fully address the issue of descrambler competition because of General Instrument's patent position. This is no longer the case with the entry of Titan Satellite Systems Corporation and The Titan Corporation's co-ownership of the VCII core patents and system elements. The issue need no longer be patent-related, but rather whether a level playing field exists, and if not, should it exist as a means of supporting the nation's HSD consumers. With this NOI, the Commission has the opportunity to assist the HSD industry in moving forward, without relying on the lengthy process of standards-setting.

V. DBS Center Issues.

The Commission asks many insightful questions regarding the current operation of the General Instrument owned DBS Center. In many cases, only programmers and General Instrument can provide complete answers. However, several issues are related to the potential for intra-VCII competition and we offer comment.

Of particular interest to the Commission is the possibility and practicality of intra-VCII competitors using a single authorization center and the ramifications of multiple, non-compatible encryption systems using a single authorization center.

We believe the issue of co-existence in a single authorization center by intra-VCII competitors is very straightforward and splits into two areas of consideration. The first involves business issues. The second relates to technical concerns.

We note that today's DBS Center for Videocipher system authorizations was initially constructed by M/A-COM (later General Instrument) for HBO at HBO's expense. HBO in its 1986 Comments <*page 18*> told the Commission:

> "After entering into the contract, however, HBO perceived that other programmers, particularly its competitors, were reluctant to commit to a facility that was controlled by HBO. In order to alleviate such potential fears and to foster a neutral, not-for-profit authorization center for programmers, HBO amended its agreement with M/A-COM and transferred its rights to the computer center to M/A-COM. M/A-COM agreed to operate the center strictly on a not-for-profit basis on behalf of the participating program services."

In 1986, HBO saw clearly that it could not be recognized by other programmers as a neutral, independent third-party operator of the DBS Center. Competitive factors in the marketplace simply made it impractical.

Titan Satellite Systems Corporation has come to the same general conclusion regarding potentially working through an authorization center run by a competitor, General Instrument. We are aware that GI has told programmers it will not authorize our LSCS modules through the DBS Center. But even if they were willing, it seems imprudent to allow one's competitor, particularly one with an oft-stated intention to block intra-VCII competition, to control the "switch" or "dialtone" that determines when and if one's customers will be served.

Relinquishing such control to a competitor is simply impractical. General Instrument cannot be reasonably expected to be truly independent and neutral in such a situation, just as HBO recognized it could not be seen as truly neutral. That is why we have already invested several million dollars in developing a Titan Authorization Center is now operating in our headquarters facility in San Diego, CA. This was a business decision. Co-existence within a center owned and managed by our competitor is a barrier that cannot be practicably overcome.

However, in a strictly technical sense, we believe firmly that there is no barrier to joint use of a single authorization center by intra-VCII competitors.

In the case of the joint use of a single center to authorize today's VCRS and LSCS modules this is very straightforward. The two systems, having compatibility at the necessary levels in the key hierarchy, can exist simultaneously within a programmer's signal. The level of compatibility is important in the context of the authorization center and the Commission's questions regarding the feasibility of a single satellite receiver having the resident capability to process and support multiple, non-compatible encryption systems. As described earlier on page 24, non-compatibility would preclude this from occurring. However, with the proper degree of compatibility, it is not only feasible, but desirable. For example, in a future digital compression system environment, if the digital audio and video are encrypted using a standard method, then there exists the ability to support multiple, imperfectly compatible encryption systems through a single satellite receiver.

Because Titan Satellite System Corporation jointly owns patents and intellectual property with General Instrument, most characters of the VCRS and LSCS systems are compatible as well, therefore, the two systems can easily be managed through a common authorization center.

However, as we move forward into new technologies and differing conditional access and encryption systems, each possessing proprietary aspects, it will in all likelihood be necessary for each system to support its own authorization center.

The current center, if used jointly by Titan Satellite Systems Corporation and General Instrument, certainly would not need new computer capacity; programmers have already paid for installation of computer and software capacity to service 50 million HSD customers, capacity that was installed with their approval and at their expense to support VCII Plus.[9] The security of each system would be insulated from the other by distinct unit addressing and by the difference in cryptographic approach as outlined in the discussion above of the unique and distinct differences in all the other levels of the key hierarchy. This would allow a flexible approach to security upgrades and replacement; in the event of a compromise of one system, full addressing of the second could continue while a security replacement took place for the other system.

Joint use of and access to a common authorization center then is not an issue of technology in the Videocipher environment as it exists today. The practicality of such joint use would hinge on whether such a center was operated by a true, independent operator functioning much as a standard regulated utility.

The Commission asks *<at footnote 22, page 9>* whether forced access of rivals to the center operated by General Instrument might blunt incentives for General Instrument to institute center improvements or discourage other entities from establishing such centers.

We do not answer for General Instrument by any means. However, it is our understanding that the center is operated on behalf of and paid for entirely by programmers and that they are the decision-makers. Thus, the only incentive that should matter to General Instrument is whether its center customers, the programmers and program distributors, request or demand system improvements and are willing to pay for the improvements. The issue of access in this context, at least theoretically, should be immaterial if the center is truly operated for and on the behalf of programmers.

Regarding establishment of separate centers, we note that new HSD entities, including Prime Star and Direct TV, are establishing independent centers. Titan Satellite Systems Corporation has already established its own center. If the current DBS center had been operated by an independent entity, we would not have proceeded with construction of our center.

The Titan Authorization Center has been established to serve our programmer customers and their authorized agents and program distributors. As noted earlier in this document, we have established extremely favorable terms, including deferral and in some cases elimination of

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[9]General Instrument, "Videocipher® II Plus/Satellite TV Encryption System Questions and Answers, Trade Editions," revised 6/90, page 1; "The VCII Plus system offers the following additional enhancements . . . support up to 50 million unique descrambler addresses, a significant increase over the VCII system."

reimbursement of Titan Authorization Center development costs, a very reasonable program for reimbursement of other of the center's fixed costs, and a cap on Titan Authorization Center operating costs through 1999. Construction of the center was straightforward. Advancements in computer technology and the availability of lower-priced, more powerful computers has made establishment of the center cost-effective.

VI. Smart Card Interface Standards for Multiple Encryption Systems.

The Commission notes the advancements made by non-Videocipher-based encryption companies as well as the trend to all-digital compression-based systems and raises concerns regarding potential consumer concerns regarding purchase and installation of multiple, incompatible receivers. The Commission seeks comments on whether it might be possible for satellite receiver manufacturers to produce receivers containing multiple smart card slots, requiring that the consumer only have to acquire the necessary smart cards and install them as needed for viewing.

This issue is very similar to the issue of multiple, non-compatible or compatible systems using the same authorization center.

It is certainly reasonable to assume that manufacturers would incur the development costs of such multi-port receivers as the Commission suggests only if there is sufficient market demand, whether the demand originates with programmers or consumers.

As discussed earlier, it is our belief that it is possible for the encryption companies and the manufacturers to develop a common interface standard, perhaps based on a key hierarchical system much like the Videocipher technology, which allows a certain level of compatibility, leading to joint usage of data streams, while maintaining cryptographic distinctions. We further believe that with what could only be unprecedented cooperation between the encryption companies, programmers and manufacturers, such a standard interface and separate smart card designs could be developed such that only a single smart card pod would be required. In this situation the systems would have sufficient compatibility to handle their distinct cryptographic functions in the smart card and communicate through the port to the receiver using common approaches.

The situation in Europe is a good example of how a standard interface can exist to support multiple systems[10]. The dominant system, then, would be determined by normal competitive market factors. Of course, cooperation and independent third-party analysis would be required to ensure compliance with system implementation specifications by each company participating in the market.

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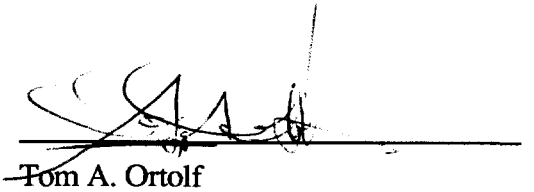
[10]Eurocrypt Access Control System for MAC/Packet Family part 6 of EBU Specification of the System of the MAC/Packet Family. EBU Technical Document 3258.

VII. Conclusion

Titan Satellite Systems Corporation urges the commission to assess the need for true competition in the encryption segment of the HSD industry. It is obvious that the result of a six year monopoly situation in this market segment have been detrimental to all segments of the HSD industry, but particularly detrimental to the American consumer. The ability to choose between products competing fairly in an open market ultimately provides the consumer the best value. This has not been the case in the HSD industry. Titan Satellite Systems Corporation also urges the commission to assess the potential negative results that will result from the imposition of yet another monopoly situation as communications technology advances. If the HSD and future communication industries are to flourish and become long-term viable alternative methods of providing entertainment, education and information to consumers, the current monopoly situation must end immediately, and mechanisms established to ensure that future competition exists in this critical communications industry segment.

Respectfully Submitted

December 24, 1992



Tom A. Ortolf
Titan Satellite Systems Corporation
3033 Science Park Road
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APPENDIX A

GENERAL INSTRUMENT VS. CHANNEL MASTER HISTORICAL PRICING EXAMPLES

General Instrument Module Sales Program includes:

- Cash Discount of 1.5%
- Container Discounts of up to $2.00 per module
- Volume Rebates ranging from $3.50 - 9.00, at purchase levels of 10K, 20K and 30K units

Channel Master Module Sales Program includes:

- Cash Discount

Pricing schedule encourages/incentivizes largest volume customers (those purchasing in excess of 20K annually) to buy from General Instrument, with Channel Master servicing smaller customers.

1990-$321 - G.I. Module Price

Quantity	*G.I.	C.M.
200-499	X	$320
500-999	X	$316
1,000-1,999	$316	$313
2,000-2,999	$316	$309
3,000-4,999	$316	$308.50
5,000 >	$305	$308

1989-$249 - G.I. Module Price

Quantity	*G.I.	C.M.
200-499	X	$249
500-999	X	$245
1,000-1,999	$245	$242
2,000-2,999	$245	$238
3,000-4,999	$245	$237.50
5,000 >	$234	$237

X = GI minimum order is 1.0K units

*Includes 1.5% Cash Prepayment Discount only. Does not include $2.00 Container discount or volume rebates ranging from $3.50-9.00

APPENDIX B

CPI PER U.S. DOL BUREAU OF LABOR STATISTICS

(Based on 1967 = 100)

Dec. Year	U.S. Av.	%+	West	%+
1985	327.4	3.8	177.2	4.1
1986	331.1	1.1	179.6	1.4
1987	345.7	4.4	187.8	4.6
1988	360.9	4.4	195.4	4.1
1989	377.6	4.6	205.0	4.9
1990	400.9	5.1	218.2	6.5
1991	413.0	3.0	224.7	3.3
1992 (June)*	419.9	3.1	229.0	3.5
Total percentage points		30.5		32.4
Average for period		3.8		4.1
Percentage inc. 85-92		28.2		29.2

*Annual rate of increase

APPENDIX C

ELECTRONICS INDUSTRY ASSOCIATION WHOLESALE PRICING TREND ANALYSIS FOR VIDEOCASSETTE RECORDER AND CAMCORDER

VIDEOCASSETTE RECORDERS

	Total Sales To Dealers in Units (Thousands)	Total Factory Sales in Dollars (Millions)	Average Value (Dollars per Unit)
TABLE 10			
VCR DECKS			
1988	10,748	2,848	265
1989	9,760	2,625	269
1990	10,110	2,439	241
1991 (est.)	10,850	2,485	229
1992 (est.)	10,550	2,374	225
TABLE 11			
VCR DECKS WITH STEREO (included in TABLE 10)			
1988	1,400	574	410
1989	1,465	596	407
1990	1,867	648	347
1991 (est.)	2,064	689	334
1992 (est.)	2,400	792	330
TABLE 12			
CAMCORDERS			
1988	2,044	1,972	965
1989	2,286	2,007	878
1990	2,962	2,260	763
1991 (est.)	2,920	2,062	706
1992 (est.)	3,100	2,139	690
TABLE 13			
TOTAL VCR DECKS AND CAMCORDERS (Sum of TABLES 10 and 12)			
1988	N/A	4,820	N/A
1989	N/A	4,632	N/A
1990	N/A	4,699	N/A
1991 (est.)	N/A	4,547	N/A
1992 (est.)	N/A	4,513	N/A

Source: Electronic Industries Association

APPENDIX C

ELECTRONICS INDUSTRY ASSOCIATION WHOLESALE PRICING TREND ANALYSIS FOR VIDEOCASSETTE RECORDER AND CAMCORDER

VCR DECK SALES RECAP/EIA 1992

	UNITS/TH	$MILLIONS
1978	402	326
1979	475	389
1980	805	621
1981	1361	1127
1982	2035	1303
1983	4091	2162
1984	7616	3585
1985	11336	4173
1986	12005	3978
1987	11702	3442
1988	10748	2786
1989	9760	2638
1990	10119	2438
1991	10718	2475

Source: Electronic Industries Association

TITAN
SATELLITE SYSTEMS

APPENDIX D

LETTER OF INTENT

October 21, 1992

Dear

I want to thank you and your staff for the time you have spent recently reviewing the proposed agreement with Titan Satellite Systems Corporation and the business issues associated with implementation of the Linkabit Smart Card System™ technology. I certainly recognize the complexities associated with your current review and the length of time that is required by corporate legal staffs to complete a contract analysis.

Nevertheless, I am sure you are receiving the same communications that I am from dealers, distributors and manufacturers daily. Uppermost in their minds is the question of whether the programming community is providing adequate support and positive response to Titan Satellite Systems Corp.

In order to proceed expeditiously, I would like to suggest an intermediate communication between «company» and Titan Satellite Systems Corporation. Specifically, I am suggesting a letter of intent (a sample letter is enclosed). Such a letter would allow you to express to the industry, and, for that matter, to the FCC or other legislative or regulatory group that you are willing to work with us provided Titan Satellite Systems Corporation meets certain stringent-yet-reasonable conditions.

This positive action on your part will neither hinder your review of our proposed agreement, nor will it eliminate necessary contract negotiations or reduce the necessity for Titan Satellite Systems Corp. to meet your requirements in a number of vital business areas.

Please review the attached proposed letter of agreement and call with your comments at your earliest convenience.

Sincerely,

Tom Ortolf
President
Titan Satellite Systems Corporation

TITAN SATELLITE SYSTEMS CORPORATION
3033 Science Park Road • San Diego, California 92121
TEL. (619) 552-9500 • FAX (619) 597-9055

APPENDIX D

LETTER OF INTENT

October 21, 1992

Mr. Tom Ortolf, President
Titan Satellite Systems Corp.
3033 Science Park Road
San Diego, CA 92121

Dear Tom:

I was very pleased to learn of the significant progress your team is making in the development of the Linkabit Smart Card System™ (LSCS) descrambler module, and, the strong support you are receiving from manufacturers, distributors and dealers.

Based on that broad industry support and the representations in your recent proposed contract and accompaning cover letter, I am pleased to inform you that «company» is hereby expressing its intent to authorize LSCS descramblers for our consumer & commercial subscriber services. Please also note that there are some caveats regarding the actual start of authorization of our services via your technology. These are:

1. «company» and Titan Satellite Systems Corp. conclude a mutually agreeable contract;

2. A comprehensive review and evaluation of the technical feasibility of the Titan Linkabit system by «company»'s staff and its representatives. Successful evaluation must include assurance that implementation of the LSCS technology will not disrupt, interrupt or otherwise adversely affect authorization of our subscribers via technology and systems from General Instrument Corp.;

3. Support evidenced by contracts and/or communication similar to this reached by Titan Satellite Systems Corp. and a significant number of other satellite television programmers.

4. Evidence to «company»'s satisfaction that potential legal entanglements as a result of Titan Satellite Systems Corporation's market entry are either eliminated via license agreement by Titan Satellite Systems Corp. or deemed to be at an acceptable business risk level by «company».

I believe the listed conditions are realistic and achievable by Titan Satellite Systems Corp. I am currently evaluating, with our staff, the proposed agreement you reviewed with me and will be in contact with you soon regarding it and the other outstanding issues.

Again, let me state that «company» remains strongly interested in your development program and is expressing its intent to proceed to implementation of the LSCS system when the conditions listed above are met.

Sincerely,

«name»
«company»

APPENDIX E

DBS AUTHORIZATION

CENTER AGREEMENT

FOR PROGRAM DISTRIBUTOR

No. DBS-_____

FOR _____

(R-12/27/91)

as part of the Basic Service other services and features as set forth in Exhibit A. Other services, such as those described in Section 9 hereof, shall not be included in the Basic Service.

3. Users. Users entitled to use the Basic Service provided by the Center, and to enter into agreements with Centercorp with respect thereto, shall consist of two categories: Programmers and Program Distributors as described below. Centercorp may enter into agreements with Programmers and with Program Distributors from time to time after the date of this Agreement. In determining whether to enter into an agreement with a prospective Programmer or a prospective Program Distributor, Centercorp, in addition to assuring that the requirements set forth in Sections 3.1 and 3.2 below are satisfied, shall also be entitled to determine to its satisfaction (in the exercise of its sole discretion) that such prospective Programmer or prospective Program Distributor has the financial capacity to meet the financial commitments which would be required under such an agreement with Centercorp. This is no assurance as to the number (if any) of Programmers or Program Distributors who shall enter into such agreements, or concerning the number of Programmers or Program Distributors which may be utilizing the Basic Service at any time during the Initial Term or any Renewal Term (as defined in Sections 6.1 and 6.2). Customer acknowledges its understanding that the amount of the Charges (as defined in Section 4) payable by it pursuant to this Agreement shall be affected by the number of Programmers, and may be affected by the number of Program Distributors, who may be utilizing the Basic Service through agreements with Centercorp from time to time.

3.1 Programmer Users. The Programmer category will consist of entities transmitting television programs via satellite which also become:

(a) A user of Scramblers for scrambling its satellite television signal feeds (whether such entity itself owns and operates the Scrambler or contracts with a third party which owns a Scrambler and which provides scrambling services); and

(b) An owner of TVRO distribution rights to the programming material being transmitted; and

(c) A provider of such satellite television programming directly to consumers on a subscription or other pay-TV basis which may include advertising (such programming being offered by the programmer or through authorized program distributors).

Upon meeting the criteria as described above and upon executing both an agreement with Centercorp similar to this Agreement ("Programmer Agreement") and a Tier-Bit Assignment in the form and under the provision set forth in Exhibit B, an entity will be deemed a Programmer and will be assigned a unique identification code for each Scrambler receiving the Data Channel from the Center and one or more of the Tier-Bits (as designated in the Tier-Bit Assignment). Two hundred and forty separate Scrambler identification codes are available, and 55 Tier-Bits are available. Each Programmer will be given the following alternatives with regard to the use of Tier-Bits assigned pursuant to a Tier-Bit Assignment:

(i) A Programmer can use all assigned Tier-Bits on an active basis, using each such Tier-Bit for authorizations of a programming service or groups of programming services. Such combination of programming services on a single Tier-Bit may be accomplished through authorizing two or more programming channels with a single Tier-Bit (even though multiple Scramblers are being used). For example, a Programmer might combine east coast and

west coast feeds on one Tier-Bit, but in such event all such feeds operating on a single Tier-Bit would always be authorized and deauthorized simultaneously.

(ii) A Programmer can reserve assigned Tier-Bits ("Option Bits") for future use on a year to year basis, as set forth in Exhibit B, so long as Centercorp is satisfied, in its sole discretion, that such Programmer has the financial and other capacity to make it likely that such Programmer will be able to utilize such Option Bits (taking into account factors such as the net worth of the Programmer, the commitments for transponder utilization held by such Programmer, and guarantees of performance available for such Programmer). However, if (and to the extent that) the number of Tier-Bits requested to be made available to potential Programmers should exceed the number of available Tier Bits, all Programmers holding such Option Bits shall be required to activate their unused Option Bits, or release them for reassignment, as set forth in Exhibit B.

(iii) Part-time Programmers (such as major sports leagues) which need a Tier-Bit for only a portion of a calendar year may be assigned a Tier-Bit for a portion of a calendar year, in calendar month increments, not to exceed the duration of a normal playing season or two hundred fifteen calendar days, whichever is less (a "Part-Time Bit"), subject to the availability of Tier-Bits as determined in its sole discretion by Centercorp. Part-time Programmers shall not be entitled to Option Bits.

For purposes of allocation of Tier-Bits, two or more Programmers may combine programming services which they offer on a single Tier-Bit (with the result that all of the programs so combined will be authorized and deauthorized simultaneously), in which event they shall jointly and severally be liable for the charges in such Tier-Bit, but may designate one such Programmer who shall pay all Charges with respect to such Tier-Bit as described in Section 4 below (allocating such Charges among themselves as they deem appropriate).

Notwithstanding the foregoing, upon request of a Programmer, and subject to the availability of Tier-Bits, and the criteria set forth in Exhibit B, Centercorp may (but shall not be obliged to, except upon renewal of this Agreement or a release and reassignment of a Tier-Bit) change the number of Tier-Bits assigned to such Programmer by execution of an amended Tier-Bit Assignment.

In addition, notwithstanding the foregoing, Centercorp (in the exercise of its sole discretion and without charge), shall be entitled to reserve up to five (5) Tier-Bits, one of which would be used for testing, demonstration or other non-commercial use by Centercorp, or for TVRO consumer descrambling for resale carriers transmitting television programs by satellite which are users of Scramblers for scrambling their satellite television signal feed to cable operators, but which are not distributing such scrambled satellite television programming to TVRO consumers, because such distribution could create issues under U.S. copyright laws. In all events, the period of such Tier-Bit reservation for the resale carriers shall expire on the earlier of (i) the date on which legislative or judicial action permits such resale carriers to provide such scrambled satellite television programming to TVRO consumers without violation of U.S. copyright law, or (ii) December 31, 1987.

Customer, as a Program Distributor, is being assigned Ports as set forth on a Port Assignment Form being executed simultaneously with the execution of this Agreement.